

Name: Key

FO-4313/6313

**Third Hour Exam, 2007**

**“Scale, Scale,.....,Scale & a little GIS ”**

$$RF = \frac{1}{S} = \frac{d}{D} = \frac{f}{(H-h)}$$

Show calculations or no partial credit!

1. Use the following terms to complete the sentences below:

**GIS Terms:**    attribute        raster        theme        line  
                  spatial        vector        point        polygon

- A. An ortho photograph stored in a GIS would be considered spatial data. (3)
- B. Stand volume information stored in a GIS would be considered attribute data. (3)
- C. A digitized timber stand boundary, with area, would be stored as a polygon. (3)
- D A 7.5' quad sheet or an Ektachrome color photograph downloaded from MARIS would most likely be stored in raster (spatial) format. (3)
- E. A John Starr road theme would most likely be stored in vector (spatial) format. (3)

2. A GIS is: an information system with data referenced to geographic coordinates (5)

3. What makes a GIS “tick”? The concept(s) and relationship(s) that make GIS a powerful analytical tool for Natural Resource Management are:

The linkage of attribute data with geographic coordinates

The topology of how spatial relationships are stored.

4. Scale is defined as: ratio of image distance to ground distance - (5)

5. The two primary characteristics of an RF are:

a. Units (5)

b. 1 in numerator (5)

6. If the distance between 0 and 1,320 ft or 0-20 chains on a graphic scale bar is 79.2/60 inches in measured length,

A. The actual/true RF scale is:  $1'' = 12,000$   $\frac{1}{5} = \frac{79.2/60/12}{1320}$  (5)

B. Equivalent scale is: 1 inch =  $1,000$  feet (5)

7. The true geographic point location system for a point on the earth's sphere on a 7.5' Quad is: latitude/longitudes (10)

8. Assuming the human eye can see 0.002 inches with slight magnification, the maximum altitude an aircraft with a 152.4 mm lens camera could fly above average terrain elevation to photograph a 12 inch object would be:

$\frac{3000}{1}$  ft  $\frac{152.4/25.4/12}{(H-W)} = \frac{0.002^2}{12''} = \frac{1}{6,000}$  (10)  
 $0.002^2 H = (0.5)(12)$   
 $H = \frac{3,000}{1}$

9. If we assume the scale on the 7.5' Quad (1:24,000) is constant and represents true ground distance, then:

$1'' = 2,000 \text{ ft.}$

A. The straight-line, ground distance between Points A and B that are 0.855 inches apart on the quad sheet is:  $1,710$  ft  $D = (0.855) 2000 = 1,710 \text{ ft.}$  (5)

B. If the image distance between Points A and B on an aerial image of the same area is 68.4/60 inches, the RF of the aerial image is:  $1'' = 18,000$  (5)

$\frac{1}{5} = \frac{68.4/60/12}{1710}$

10. On a 7.5' Quad (RF = 1:24,000) where 2.5 minutes of latitude change measures 458/60 inches and 2.5 minutes of longitude change measures 382/60 inches, (circle whether the X/Y distance is latitude or longitude)

A. UTM scale on a 7.5' Quad is 1 inch =  $609.6$  meters  $1/60'' = 10.16 \text{ m}$  (4)

B. an X distance of 10/60 inches =  $101.6$  meters or  $3.927$  seconds (? lat/long) (6)

C. a Y distance of 10/60 inches =  $101.6$  meters or  $3.275$  seconds (? lat/long) (6)

$\Delta Y = \frac{150}{458} = 0.3275 \text{ sec}/\frac{1}{60} \times 10 = 7.299 \text{ sec} = \text{lat}$   
 $\Delta X = \frac{150}{382} = 0.3927 \text{ sec}/\frac{1}{60} \times 10 = 3.927 \text{ sec.} = \text{long}$

**Bonus: All or None 5 points**

The correct name of this course is: Spatial Technologies in Natural Resource Management.